

What is claimed is:

1. A method for identifying an agent that decreases activity of a mechanosensitive  $\text{Ca}^{2+}$ -permeable (MscCa) channel comprising:
  - contacting a cell expressing an MscCa channel with a candidate agent to yield a treated cell; and
  - comparing the activity of an MscCa channel of the treated cell with the activity of an MscCa channel of a control cell not contacted with the candidate agent, wherein decreased activity of an MscCa channel of the treated cell indicates the candidate agent decreases the activity of an MscCa channel.
2. The method of claim 1 wherein the MscCa channel comprises a polypeptide comprising an amino acid sequence of at least 90% identity to SEQ ID NO: 2, wherein the polypeptide has MscCa activity.
3. The method of claim 1 wherein the MscCa channel comprises a polypeptide comprising SEQ ID NO: 2.
4. The method of claim 1 wherein the cell is a tumor cell.
5. The method of claim 1 wherein the cell is a human prostate tumor cell line.
6. The method of claim 5 wherein the human prostate tumor cell line is ATCC CRL-1435.
7. The method of claim 1 wherein the cell is a motile cell, and wherein the treated motile cell has decreased motility compared to the control cell.
8. The method of claim 1 wherein the cell is an invasive cell, and wherein the treated invasive cell has decreased invasiveness compared to the control cell.
9. The method of claim 1 wherein the treated cell has decreased proliferation compared to the control cell.

10. The method of claim 1 wherein the treated cell has increased apoptosis compared to the control cell.

11. An agent identified by the method of claim 1.

12. A method for identifying an agent that decreases a phenotype of a cell comprising:

contacting a cell expressing an MscCa channel with a candidate agent to yield a treated cell; and

comparing the phenotype of the treated cell with the phenotype of a control cell not contacted with the candidate agent, wherein the phenotype is selected from the group of motility, invasiveness, proliferation, and a combination thereof, and wherein a decreased phenotype for the treated cell indicates the candidate agent decreases the phenotype.

13. The method of claim 12 wherein the candidate agent causes activity of an MscCa channel of the treated cell to decrease.

14. The method of claim 12 wherein the MscCa channel comprises a polypeptide comprising an amino acid sequence of at least 90% identity to SEQ ID NO: 2, wherein the polypeptide has MscCa activity.

15. The method of claim 14 wherein the MscCa channel comprises a polypeptide comprising SEQ ID NO: 2.

16. The method of claim 12 wherein the cell is a tumor cell.

17. The method of claim 12 wherein the cell is a human prostate tumor cell line.

18. The method of claim 17 wherein the human prostate tumor cell line is ATCC CRL-1435.

19. An agent identified by the method of claim 12.

20. A method for treating cancer comprising:  
administering to a subject having cancer an effective amount of a composition comprising an agent that decreases activity of a mechanosensitive ion channel present on a cancer cell, wherein a symptom of the cancer is decreased.
21. A method for decreasing metastasis of a cancer cell comprising:  
administering to a subject at risk of developing cancer an effective amount of a composition comprising an agent that decreases activity of a mechanosensitive ion channel.
22. A method for decreasing a symptom associated with cancer comprising:  
administering to a subject having cancer an effective amount of a composition comprising an agent that decreases activity of a mechanosensitive ion channel.
23. The method of claim 20, 21, or 22 wherein the mechanosensitive ion channel is a mechanosensitive  $\text{Ca}^{2+}$ -permeable (MscCa) channel.
24. The method of claim 20, 21, or 22 wherein the agent is a polypeptide comprising an amino acid sequence comprising at least 90% identity to SEQ ID NO:1 or to SEQ ID NO:7.
25. The method of claim 24 wherein the agent is a polypeptide comprising SEQ ID NO:1 or SEQ ID NO:7.
26. The method of claim 23 wherein the agent is an antibody that specifically binds an MscCa polypeptide.
27. The method of claim 26 wherein the antibody binds to an epitope present on SEQ ID NO:5 or SEQ ID NO:6.

28. The method of claim 23 wherein the MscCa channel comprises an MscCa polypeptide, and wherein the agent is a polynucleotide that decreases expression of the MscCa polypeptide.

29. The method of claim 20, 21, or 22 wherein the cancer is prostate cancer, breast cancer, colon cancer, lung cancer, bladder cancer, ovary cancer, pancreas cancer, or skin cancer.

30. The method of claim 23 wherein the agent decreases activity of an MscCa channel comprising a polypeptide comprising SEQ ID NO: 2.

31. A method for inhibiting expression of an MscCa polypeptide comprising:

administering into a cell an effective amount of an RNA polynucleotide, wherein the polynucleotide comprises a sense strand and an antisense strand, wherein the sense strand comprises a nucleotide sequence of between 16 and 30 nucleotides, wherein the nucleotide sequence is substantially identical to consecutive nucleotides of an mRNA encoding a polypeptide of SEQ ID NO:2, and wherein the cell comprising the RNA polynucleotide has decreased MscCa activity, decreased motility, decreased invasiveness, or a combination thereof, when compared to a control cell that does not comprise the RNA polynucleotide.

32. A method for treating cancer comprising:

administering to a subject having cancer an effective amount of an RNA polynucleotide, wherein the polynucleotide comprises a sense strand and an antisense strand, wherein the sense strand comprises a nucleotide sequence of between 16 and 30 nucleotides, wherein the nucleotide sequence is substantially identical to consecutive nucleotides of an mRNA encoding a polypeptide of SEQ ID NO:2, and wherein a symptom of the cancer is decreased.

33. A method for decreasing metastasis of a cancer cell comprising:

administering to a subject at risk of developing cancer an effective amount of an RNA polynucleotide, wherein the polynucleotide comprises a sense strand

and an antisense strand, wherein the sense strand comprises a nucleotide sequence of between 16 and 30 nucleotides, and wherein the nucleotide sequence is substantially identical to consecutive nucleotides of an mRNA encoding a polypeptide of SEQ ID NO:2.

34. A method for decreasing a symptom associated with cancer comprising: administering to a subject having cancer an effective amount of an RNA polynucleotide, wherein the polynucleotide comprises a sense strand and an antisense strand, wherein the sense strand comprises a nucleotide sequence of between 16 and 30 nucleotides, wherein the nucleotide sequence is substantially identical to consecutive nucleotides of an mRNA encoding a polypeptide of SEQ ID NO:2.